

WHAT IS CLAIMED IS:

1. A communication apparatus having a network device connected to a network to be used for outputting and receiving packets to and from said network, said communication apparatus comprising:

time measurement means for measuring a time on the basis of a clock signal having a predetermined frequency;

transmission process means for receiving information data from an application at a higher level, packetizing said information data, outputting the packet to said network by way of said network device and saving sender information including a transmission time of said packet;

reception process means for receiving a predetermined packet from said network by way of said network device, generating receiver information including an arrival time of said packet by using said time measurement means, saving said receiver information, depacketizing said packet to obtain predetermined information data and outputting said predetermined information data to an application at a higher level; and

data control means for controlling flows of said information data.

2. A communication apparatus according to claim 1

wherein said communication apparatus further comprising a management-packet process means for:

reading out said sender information saved in said transmission process means and said receiver information saved in said reception process means at predetermined transmission intervals;

generating a management-information packet based on said sender information and said receiver information;

transmitting said management-information packet to said network by way of said network device; and

acquiring the management-information packet generated by another communication apparatus.

3. A communication apparatus according to claim 1 wherein said reception process means includes:

storage means for storing time information showing a point of time measured by said time measurement means as a packet arrival time for each reception of a packet; and

reception-state examination means for examining a state at a reception time by said time information, which is generated continuously.

4. A communication apparatus according to claim 1 wherein said reception process means includes correction means for:

comparing transmission-time information included in a received packet as a transmission point of time measured for said packet by the time measurement means of the transmitting communication apparatus with time information showing a point of time measured as an arrival time of said packet by said time measurement means; and

correcting said time measurement means so as to synchronize said time measurement means of a transmitting communication apparatus on the basis of said transmission-time information in case that a difference between said transmission point of time and said arrival time is beyond a predetermined range.

5. A communication apparatus according to claim 1 wherein said reception process means includes:

storage means for storing transmission-time information, which is included in a first packet received after initialization, as a transmission point of time measured for said packet by the time measurement means of the transmitting communication apparatus;

time-measurement start means for driving said time measurement means to start a measurement of time upon reception of said packet;

addition means for adding data of time information

generated by said time measurement means as a result of said measurement to data of said transmission-time information stored in said storage means; and

time information generation means for generating time information synchronized with time information generated by said time measurement means of the transmitting communication apparatus.

6. A transmission apparatus having a network device connected to a network to be used for outputting a packet to said network, said transmission apparatus comprising:

transmission process means for receiving information data from an application at a higher level, packetizing said information data, outputting said packet to said network by way of said network device and saving sender information showing conditions at a transmission time of said packet; and

data control means for controlling a flow of said information data..

7. A transmission apparatus having a network device connected to a network to be used for outputting a packet to said network, said transmission apparatus comprising:

payload storage means for temporarily storing

information data received from an application at a higher level as a payload of said packet;

determination means for determining whether or not said information data received from said application at a higher level includes predetermined attached information to be attached to said packet;

attached-information storage means for extracting said attached information from said information data received from said application at a higher level and temporarily keeping said attached information if said determination means determines that said information data received from said application at a higher level includes said attached information;

control means for allocating an area in said payload storage means as an area to be used for storing said attached information if said determination means determines that said information data received from said application at a higher level includes said attached information; and

attached-information write means for writing said attached information kept temporarily in said attached-information storage means into said area allocated by said control means as an area to be used for storing said attached information.

8. A transmission apparatus according to claim 7 wherein said control means:

allocates an area in said payload storage means as an area to be used for storing transmission control information for controlling transmission of said packet stored in said payload storage means; and

further has transmission control information write means for monitoring a result output by said determination means and a total amount of the information data stored in said payload storage means to determine whether or not a predetermined transmission condition is satisfied and writing information necessary for said transmission of said packet into said area allocated in said payload storage means as an area to be used for storing said transmission control information if said transmission condition is satisfied.

9. A transmission apparatus according to claim 8 wherein said transmission control information write means:

writes transmission request information making a request for execution of said transmission of said packet into said payload storage means as said transmission control information if said transmission condition is satisfied; and

further has transmission control means for monitoring said transmission control information to execute said transmission of said packet in accordance with said transmission control information if said request information for execution of said transmission of said packet is detected.

10. A reception apparatus having a network device connected to a network to be used for receiving a packet from said network, said reception apparatus comprising:

time measurement means for measuring a time on the basis of a clock signal having a predetermined frequency;

reception process means for receiving a predetermined packet from said network by way of said network device, generating receiver information including an arrival time of said packet by using said time measurement means, saving said receiver information, depacketizing said packet to obtain predetermined information data and outputting said predetermined information data to an application at a higher level; and

data control means for controlling a flow of said information data.